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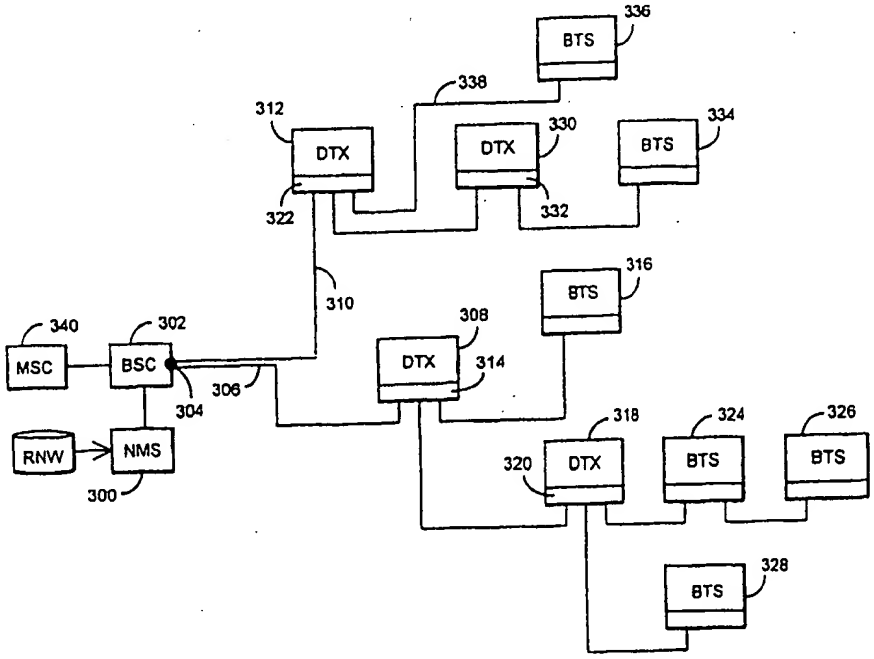
(54) Title: METHOD OF CONNECTING NETWORK ELEMENTS TO A RADIO SYSTEM, AND RADIO SYSTEM

(57) Abstract

The invention relates to a radio system and a method of connecting network elements to the radio system comprising one or more network elements (316, 324, 326, 328, 334, 336), a base station controller (302) and a network management system (300) that are operatively interconnected by means of telecommunication connections. Information between the network elements is transmitted in frames that are divided into time slots. The base station controller (302) controls one or more network elements. Network identification information is fed into a network element to be installed and the network element is physically connected to the system by means of the telecommunication connections. To ensure reliable and quick network element installation in the frames that are used for communication with the network elements by the base station controller, unused consecutive time slots of the frames are divided into one or more groups (406, 412). Each group has one time slot (408, 414) used as a communication control channel as regards time slot allocation from said group. The base station controller allocates necessary telecommunication capacity for the use of the communication between the network element and the base station controller, and the allocated telecommunication capacity is branched by software through the telecommunication connections to the network elements.



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INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI 99/00351

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: H04Q 7/34, H04Q 7/36
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: H04Q, H04L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 9501015 A1 (NOKIA TELECOMMUNICATIONS OY), 5 January 1995 (05.01.95), page 3, line 29 - page 4, line 11; page 5, line 7 - line 12	1,9-10
A	WO 9614720 A1 (NOKIA TELECOMMUNICATIONS OY), 17 May 1996 (17.05.96), page 2, line 31 - page 3, line 28	1-14
E	WO 9935800 A2 (NOKIA TELECOMMUNICATIONS OY), 5 July 1999 (05.07.99), page 2, line 17 - line 27; page 3, line 10 - line 23	1-14

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
28 October 1999	29 -10- 1999
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. + 46 8 666 02 86	Authorized officer HENRIK BODIN/MN Telephone No. + 46 8 782 25 00

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI 99/00351

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
E	WO 9922541 A1 (TELEFONAKTIEBOLAGET LM ERICSSON), 6 May 1999 (06.05.99), page 4, line 20 - page 5, line 6; page 15, line 3 - line 16 -- --------	1-14

INTERNATIONAL SEARCH REPORT

Information on patent family members

28/09/99

International application No.
PCT/FI 99/00351

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9501015 A1	05/01/95	AU 681890 B	11/09/97
		AU 6972994 A	17/01/95
		CN 1126009 A	03/07/96
		EP 0705508 A	10/04/96
		FI 932917 A	24/12/94
		JP 8511922 T	10/12/96
		NO 955294 A	22/02/96
		US 5715245 A	03/02/98
WO 9614720 A1	17/05/96	AU 688612 B	12/03/98
		AU 3806895 A	31/05/96
		EP 0793894 A	10/09/97
		FI 945223 A	08/05/96
		JP 10508447 T	18/08/98
		NO 972094 A	06/05/97
WO 9935800 A2	05/07/99	FI 3422 U	28/05/98
		FI 980024 D,V	16/01/98
WO 9922541 A1	06/05/99	AU 9657798 A	17/05/99

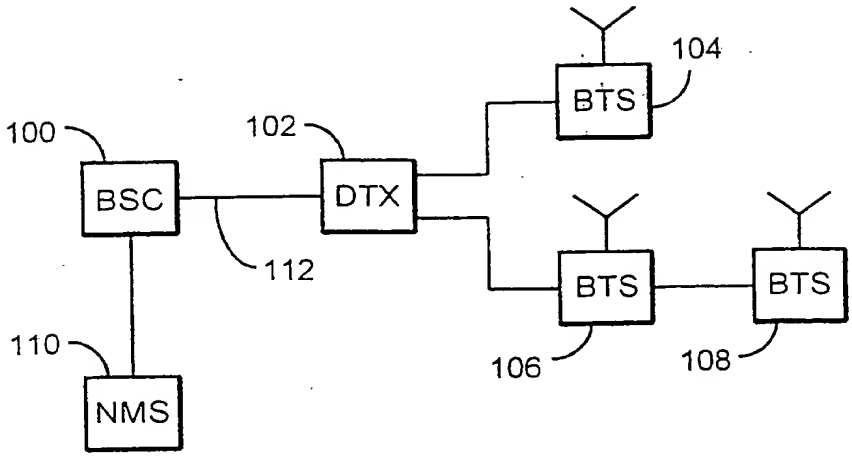

Fig. 1

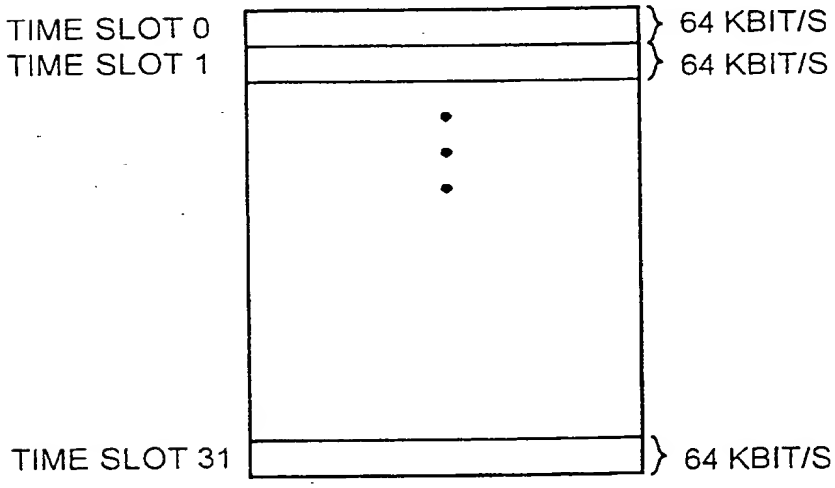

Fig. 2

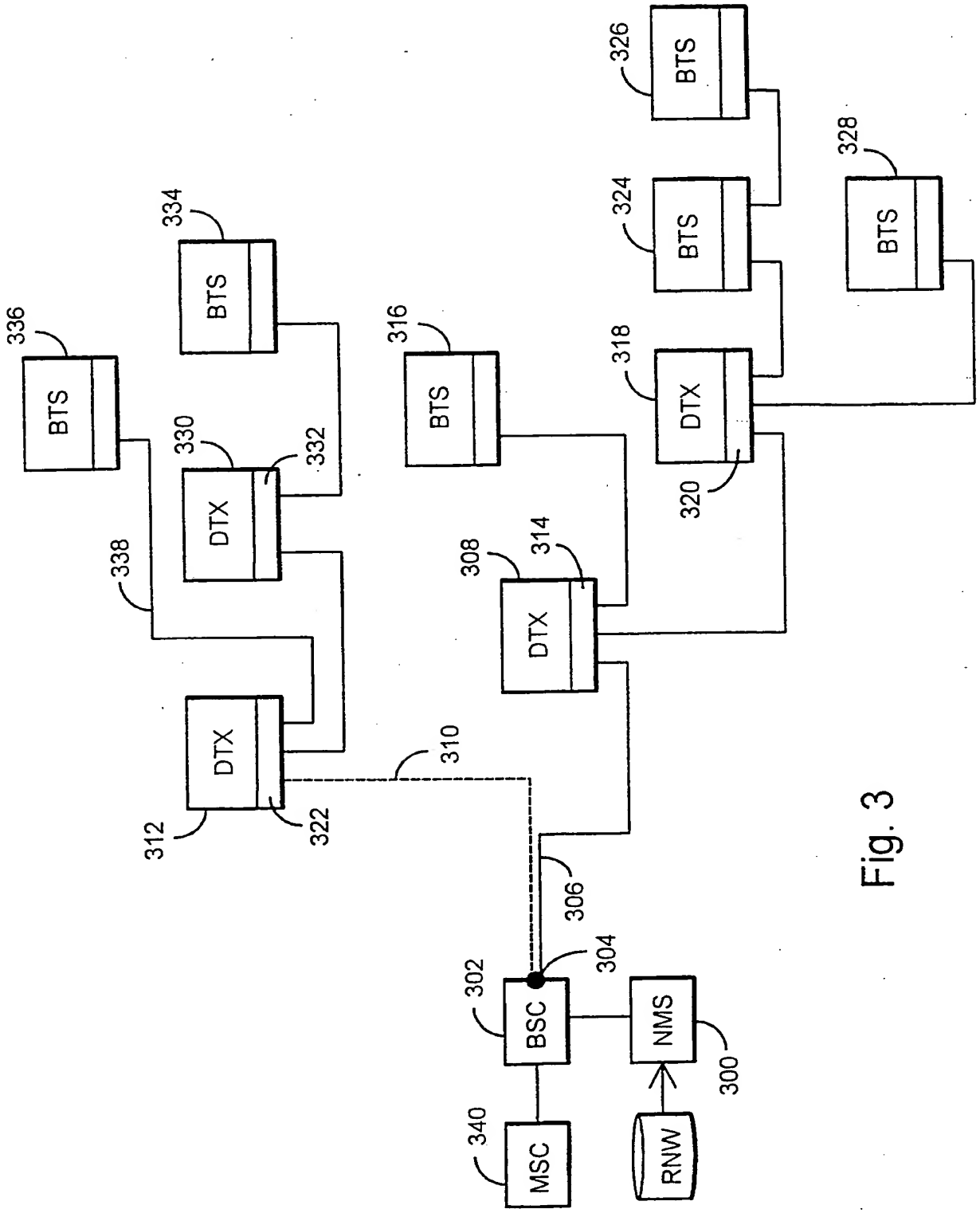
BTS
326
BTS
328
BTS
324
BTS
334
BTS
336
BTS
316
DTX
318
330
332
DTX
320
338
DTX
308
314
DTX
310
312
322
306
304
302
BSC
NMS
300
340
MSC
RNW

Fig. 3

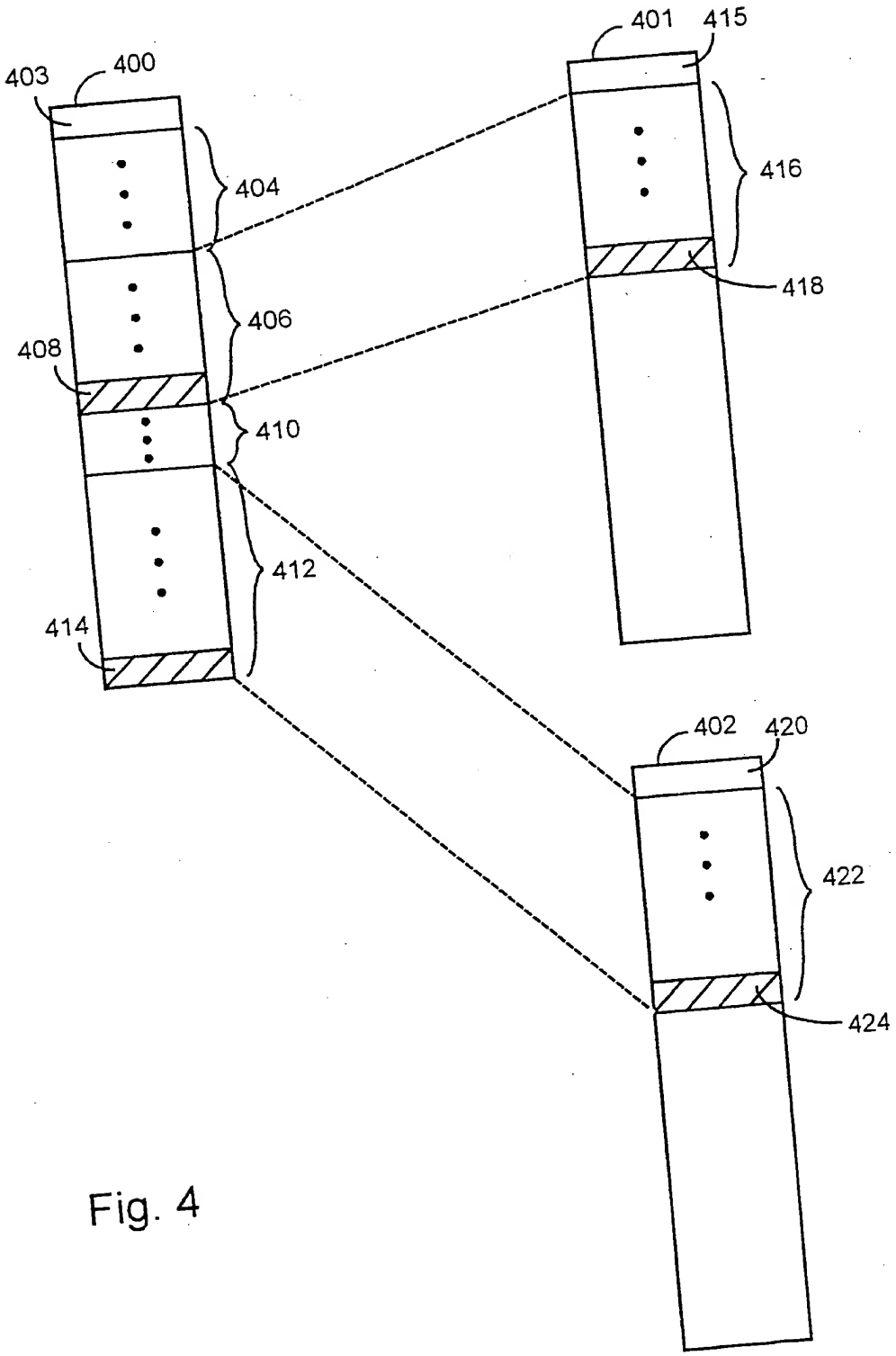

Fig. 4

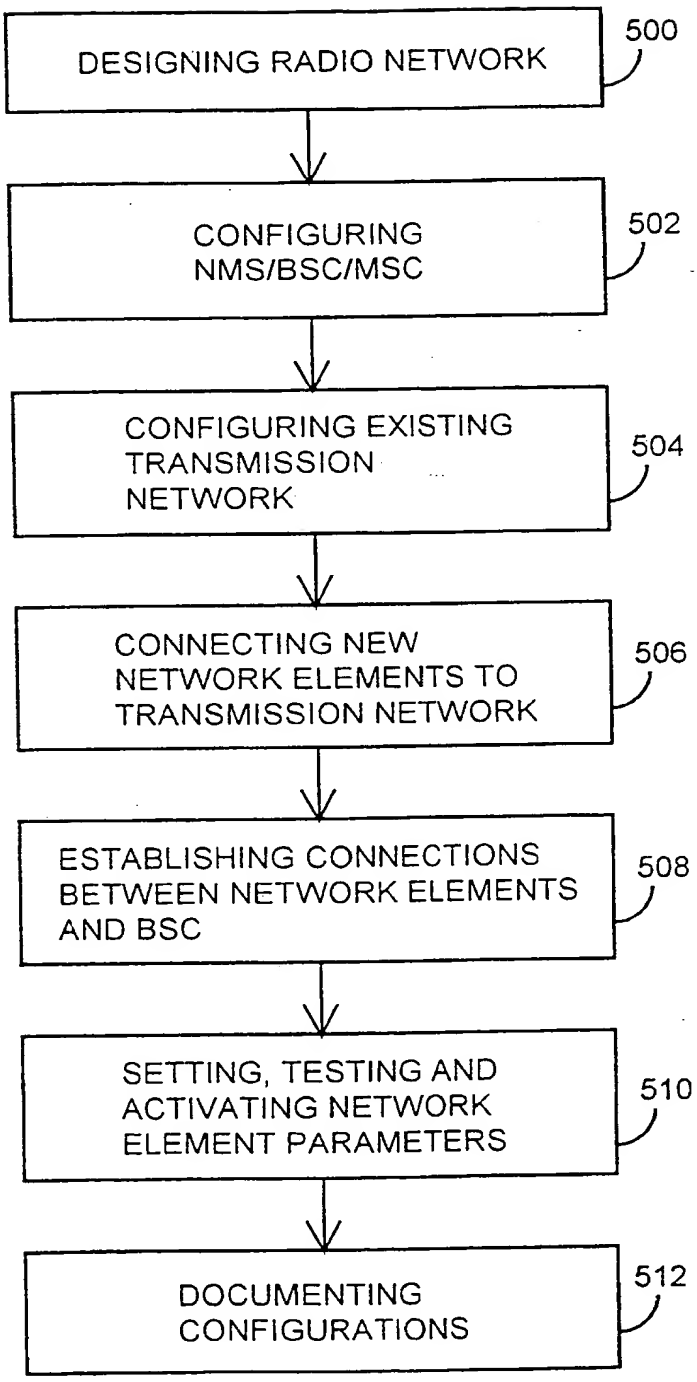
DESIGNING RADIO NETWORK
500
CONFIGURING NMS/BSC/MSC
502
CONFIGURING EXISTING TRANSMISSION NETWORK
504
CONNECTING NEW NETWORK ELEMENTS TO TRANSMISSION NETWORK
506
ESTABLISHING CONNECTIONS BETWEEN NETWORK ELEMENTS AND BSC
508
SETTING, TESTING AND ACTIVATING NETWORK ELEMENT PARAMETERS
510
DOCUMENTING CONFIGURATIONS
512

Fig. 5

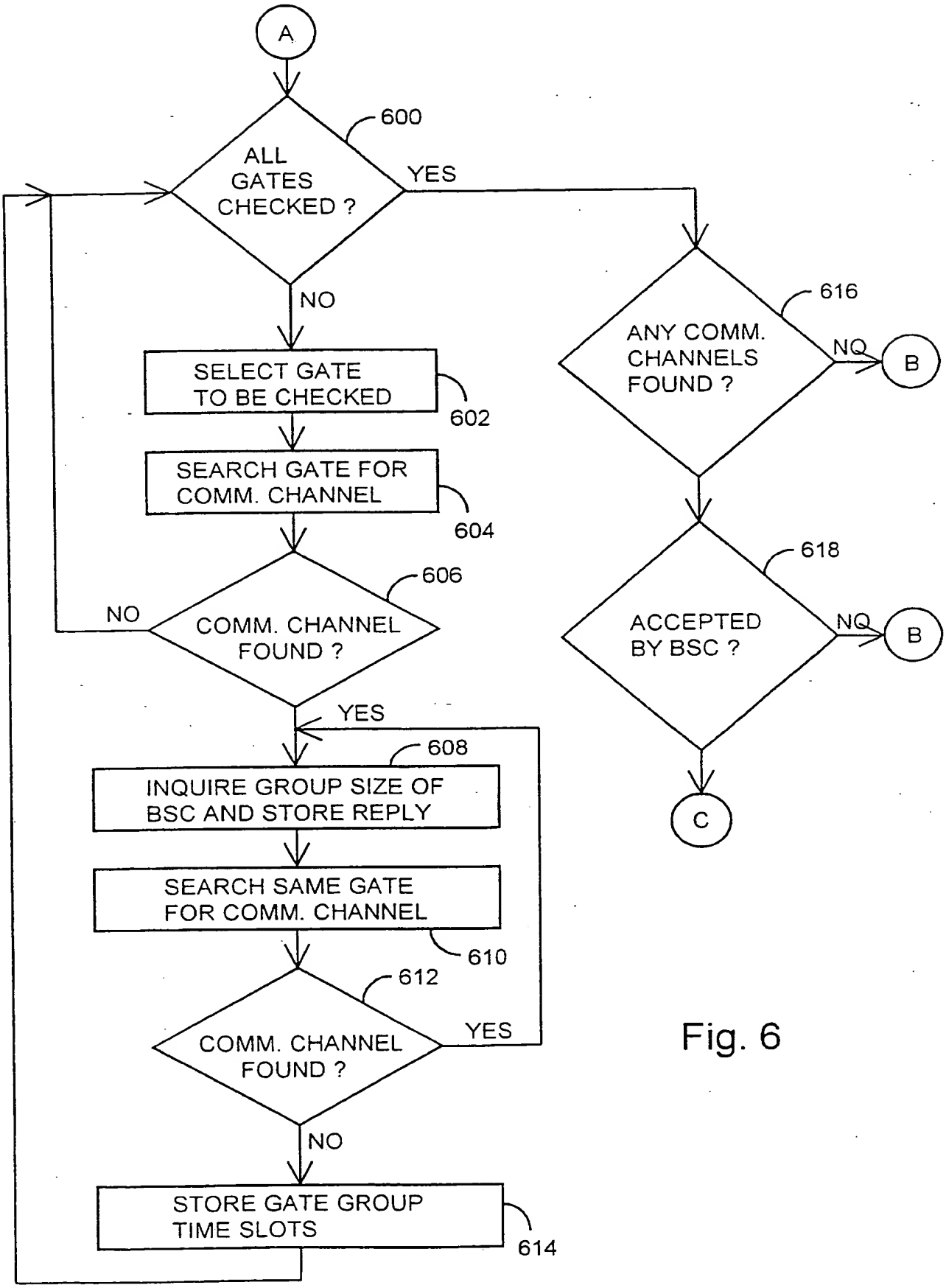
A
600
ALL GATES CHECKED ?
YES
NO
SELECT GATE TO BE CHECKED
602
SEARCH GATE FOR COMM. CHANNEL
604
606
COMM. CHANNEL FOUND ?
NO
YES
608
INQUIRE GROUP SIZE OF BSC AND STORE REPLY
SEARCH SAME GATE FOR COMM. CHANNEL
610
612
COMM. CHANNEL FOUND ?
YES
NO
STORE GATE GROUP TIME SLOTS
614
616
ANY COMM. CHANNELS FOUND ?
NO
B
618
ACCEPTED BY BSC ?
NO
B
C

Fig. 6

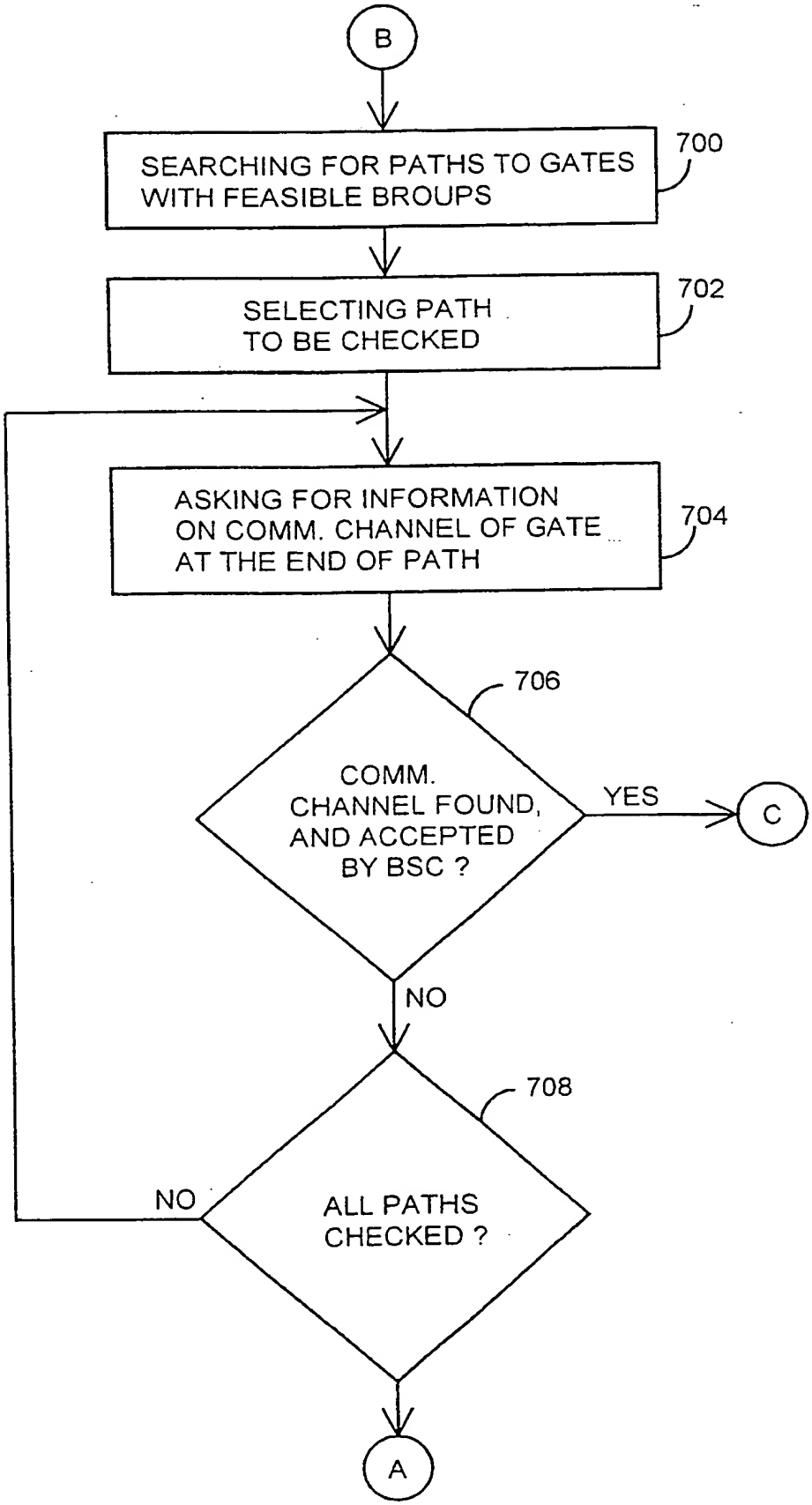

Fig. 7

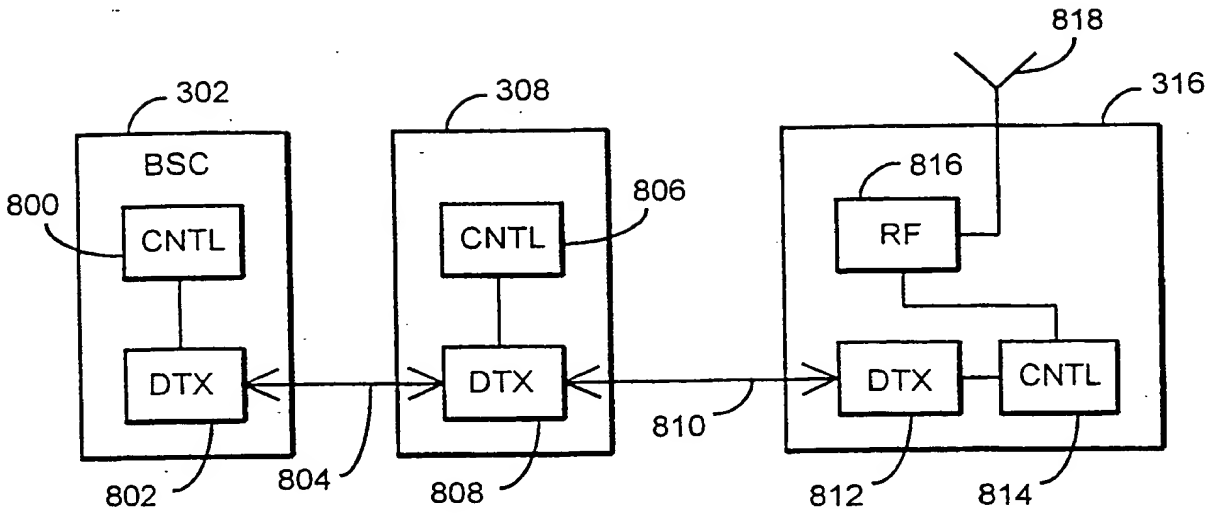

Fig. 8

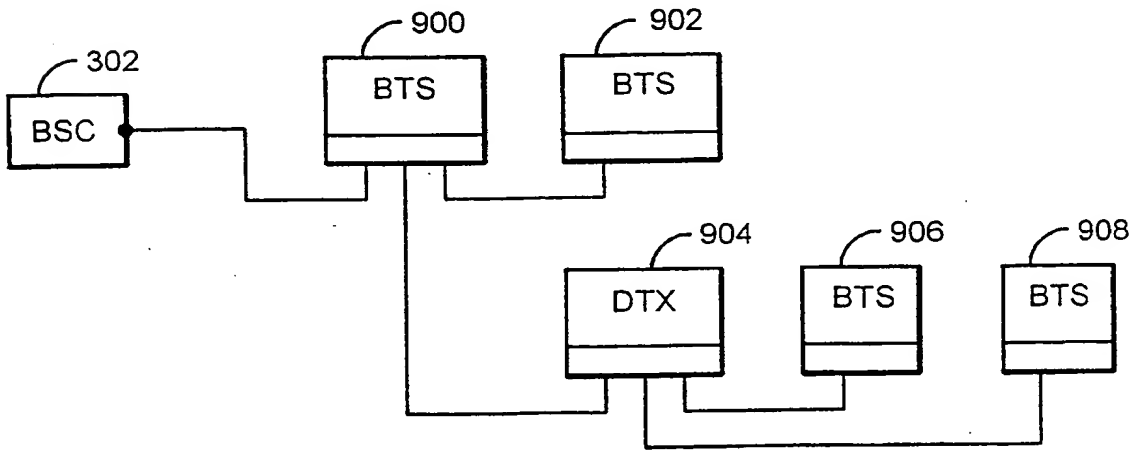

Fig. 9a

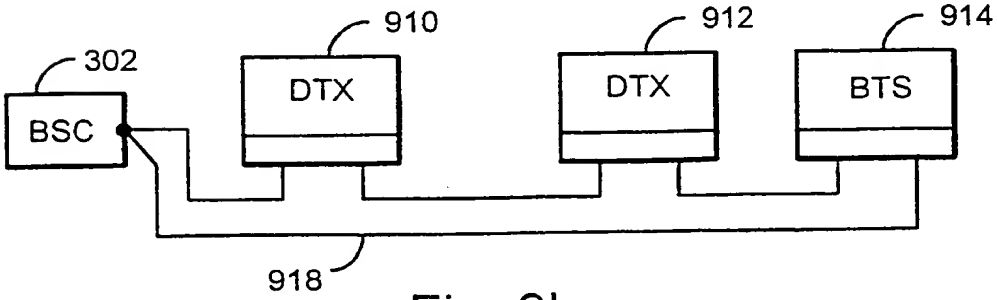

Fig. 9b